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ABSTRACT

This report describes the distance education program made available to rural Utah residents by Utah State University via the COM-NET telecommunications system. Both the four distinct delivery networks used and the infrastructure support system are detailed, and information is provided on: student performance and satisfaction with the long distance learning program, which includes courses for eight undergraduate and graduate degrees; instructor preference for various modes of distance education; the courses taught; and the growth of the program, which currently has 1,200 enrollments quarterly. Several research and evaluation projects are described, including two which stress the importance of faculty to the success of the program. A list of 14 references is provided, and two attachments--a map showing the 22 COM-NET outreach sties, and a diagram of the system's infrastructure--are included. (EW)

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PHILOSOPHY

Utah State University, the land grant institution for the state of Utah, began a search for cost effective educational telecommunication devices with which to alleviate the financial and faculty shortfalls experienced due to a 110% increase in off-campus credit enrollment between 1979 - 1984 (Sleight/Tueller, 1984). In response to the educational needs of the residents of rural Utah, the COM-NET telecommunication system was developed and implemented at Utah State University in 1984. Initially located at seven existing USU continuing education centers which were established by a mandate from the Utah State Board of Regents in the mid 60's COM-NET has now grown to 22 outreach centers including three in the Utah State prison, resulting in over 1200 enrollments quarterly (Utah Coordinating Council of Higher Education, 1969).

The center concept is the backbone of Utah State University's COM-NET systems (Tueller, 1986). The technology or existing devices are based upon the need to deliver the greatest number of interactive communication modes for the limited resources available as opposed to using the newest most expensive system available. It is the philosophy of USU Life Span Learning that any educational telecommunication system must possess two way interaction without which only information dissemination is all that is possible.

OBJECTIVE To meet the informational needs of rural Utah by delivering the greatest possible variety of educational programs and courses with regularity and quality to the greatest number of rural residents, cost effectively, with regard to faculty resources as well as funds.

SYSTEMS

COM-NET Services is comprised of two major catagories, i.e., the delivery devices and the infrastructure or support system. In harmony, these two systems work to guarantee the smooth functioning of quality programs.

A. Devices – The original COM-NET system merely touches the surface in alleviating the educational needs of rural Utah. Due to this fact, USU has designed and developed three additional systems serving 24 distant outreach sites. (see attachment A)

1. Audiographic Network (A-NET) the original COM-NET. The backbone of this network consists of two leased telephone circuits (audio/data) in a star configuration consisting of 17 sites on which the following devices reside (multiple usage of the lines is accomplished through switching):

a. 2 way audio ..... Darome public address system
b. 2 way print materials ..... Canon facsimile machines
c. 2 way writing boards ..... AT&T writing boards
d. 2 way factual video ..... Colorado Video slow scan
e. 2 way file services ..... IBM PC computers networked to USU Library
f. System mobility ..... Westell Bridge/Mobile Units
g. System back up ..... Cassette taping of Audio/Data
h. Motion color video ..... VHS recorders
i. Video print outs ..... Mitsubishi video printer

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2. Vertical Blanking Interval Network (V-NET). This system utilizes the Vertical Blanking Interval (VBI) of broadcast video, supported by a dedicated 4-wire audio telephone circuit in a star configuration. This system consists of eight sites on which the following devices are incorporated (Sleight & McClelland, 1986):

a. 2 way audio .....Darome public address system
b. 2 way print materials .....Canon facsimile machines
c. Color fast scan video .....Colorado Video/USU 7 sec. VBI fast scan
d. System back up.....VHS recorders

This system simulcasts course work in conjunction with the state microwave network resulting in increased services to rural Utah.

3. Engineering Telecommunications Network (E-NET). This system was designed and developed to address the identified needs of engineering intensive industry along the Wasatch Front. It utilizes a broadcast video channel (KULC) supported by a dedicated 4-wire audio telephone circuit in a star configuration. The multiple usage of the telephone circuit is accomplished by use of Optel voice over data modems. The system consists of five sites on which the following devices are incorporated (Seamons & Harris, 1987):

a. 2 way audio .....Darome public address system
b. 2 way print materials .....Canon facsimile machines
c. 2 way color graphics .....Optel Telewriter III writing tablets
d. 2 way color slow scan video ....Optel Telewriter III video
e. Color motion video.....KULC Channel 9
f. 2 way data delivery .....AT type computers
g. System back up.....VHS recorder

4. Information Network (I-NET). In order to provide University Library support for the course work at the rural sites, the State library and participating community libraries in association with USU, i.e., Merrill Library, Life Span Learning, and Kellogg ICLIS are implementing an electronic information retrieval system. The system utilizes standard telephone circuits, PC compatable computers, modems, software and extensive training over COM-NET systems (Seamons, 1987a).

5. Publications Network (P-NET). Westinghouse, the USU Book Store, and COM-NET are implementing an electronic text book ordering and dissemination system guaranteeing 24-hour delivery of text.

B. Infrastructure–Although the delivery devices appear to be the most noticeable it has been found after three years of service that the human element is the major determinant of the success or failure of any system or course. In order to bridge the gaps between instructor and students, key individuals and processes have been identified and established in order to guarantee the smooth functioning of the established devices (see attachment B). These key positions and functions are as follows (Seamons & Sleight, 1986):

1. CENTER DIRECTORS: liaisons between needs of the rural communities and the campus.
2. COM-NET DIRECTOR: synthesizes the needs of the varying outreach centers and the needs of the University.
3. TEACHING ASSISTANTS: they are the eyes and ears of the instructors during class, monitoring the needs of the students and communicating them to the instructor.
4. INSTRUCTIONAL DESIGNER: Adapts and modifies the existing courses and inservices those involved with its delivery.
5. SYSTEM ENGINEER: guarantees the smooth functioning of the devices.
6. SYSTEM MANAGER: oversees the logistical functions of credit courses delivery.
7. FACULTY: committed to the outreach concept and empathetic to the needs of the information poor in rural Utah.

DEGREES

Currently there are eight degrees offered. The majority incorporate a two-year cycle.

1. Bachelors of Psychology (upper division)
2. Bachelors of Business Administration (upper division)
3. Masters of Education in Instructional Technology
4. Masters of Social Science with an emphasis in Human Resource Administration
5. Masters in Family Life
6. Masters of Electrical Engineering (3 year cycle)
7. Masters of Mechanical Engineering (3 year cycle)
8. Administrative Supervisory Endorsement (1 year core courses)

Future Programs include:

1. Bachelors in American Studies (upper division)
2. Masters in Special Education (core courses)

GROWTH

Quarter	Credits Offered	Enrollment	Hrs/week
Fall '84	35	284	33
Winter '85	41	332	38
Spring '85	38	283	35
Summer '85	26	157	24
Fall '85	23	253	26
Winter '86	46	468	43
Spring '86	43	393	40
Summer '86	38	293	35
Fall '86	75	780	71
Winter '87	70	746	65
Spring '87	71	782	65
Summer '87	83	427	75
Fall '87	79	1258	72

EVALUATION / RESEARCH

It is the philosophy of USU Life Span Learning that, in addition to facilitating educational services to rural Utah, COM-NET serves a significant role in the field of Distance Education functioning as a major test bed for national as well as international field testing and dissemination of Research and Evaluation of the numerous variables associated with this emergent field.

A. National Endowment for the Humanities (NEH) Evaluation 1984-85. Funds were provided for the design and development of nine humanities courses for the COM-NET system. Emphasis was placed upon the design and production of program manuals (Wilde, 1985).

1. Outside Evaluation for NEH Dr. Ralph Muter – Associate Vice President for Academic Affairs and Dean of Regional and Continuing Education at California State University at Chico.

* "Utah State is in an advantaged position because of the development of the current delivery system, the experience gained in the past year will be invaluable for the development of a full motion video system."
* "The students were universal in their praise for the project and the quality of their learning experience...these students would not be able to participate in an University experience if it were not for this project.
* "The importance of this support infrastructure cannot be overemphasized."

2. Overall Student Satisfaction for NEH. Dr. Byron Burnham – USU Extension Evaluation Specialist OVERALL STUDENT SATISFACTION – Items 1-10 on the USU Course Evaluation Form (scale 0-4)

a. COM-NET	3.0	no significant difference
b. NEH	3.4	slight difference
c. Face to face	3.5	no significant difference

B. Student Performance & Satisfaction during the 1985-86 school year (Seamons, 1987b)

	COM-NET	ON-CAMPUS
$\bar{X}$ GPA	3.05	3.14
$\bar{X}$ STUDENT SATISFACTION	3.28	3.5 Spring '86

C. Influence of Teaching Style, Instructional Techniques, and Devise use on Student Satisfaction and Student Performance (Seamons, 1987c)

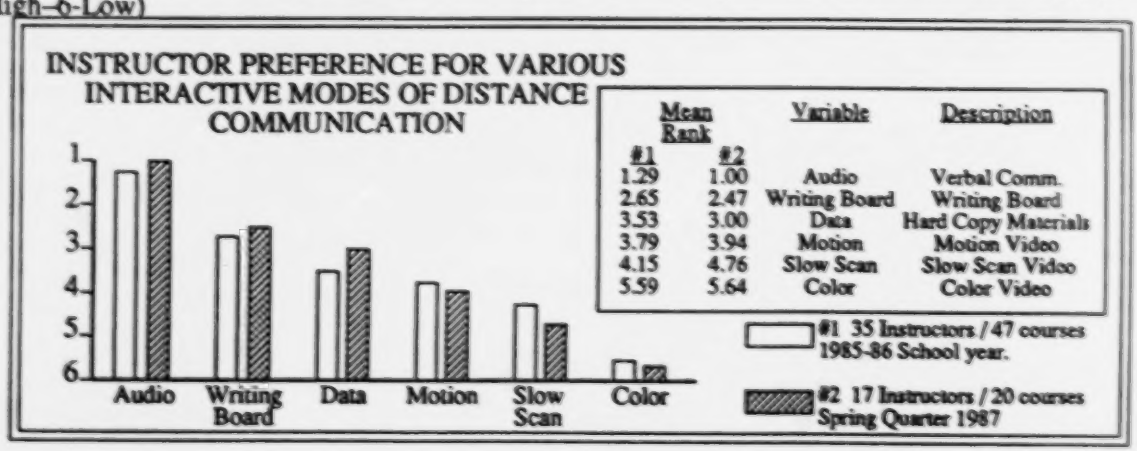
Abstract Random Teaching Styles – influences student satisfaction in a positive manner
Discovery Type Instructional Techniques – influence student satisfaction in a positive manner
Abstract Random Teaching Styles – influence Discovery Technique use in a positive manner
Abstract Sequential Teaching Styles – influence Abstract Device use in a positive manner

D. Accounting Series (201, 202, 203) taught over a variety of distance delivery modes (Sopkiewicz, 1987). The comparison of an on-campus class, a traditional extension class, and a COM-NET class using the same instructor, standardized pre and post tests, over the three course accounting series.

Looking for consistency

1. Between courses
2. Within students – (compared best-medium-poorest students)
   NO SIGNIFICANT DIFFERENCE @ .05 level in learning gain
   COM-NET group 1 standard deviation lower in pre test skills

E. Instructor Preference for Various Modes of Distance Communication (Seamons & Tueller, 1987). #1, Data was collected from 35 instructors who taught on the COM-NET system during the 1985-86 school year. #2, data from 17 instructors who taught Spring Quarter 1987. They were asked to rank order those modes of delivery most necessary to their educational delivery.(1-High–6-Low)



F. Low Bit Rate Vector Quantization Video Compression Project–Dr. Richard Harris & Dr. Joe Doupnik of the Department of Electrical Engineering at USU, 1986. This software driven project is directed to provide near motion color video capabilities over standard telephone lines. The development is projected by summer of 1988.

G. Factors Which Impact Learning at a Distance- (Fellenz, 1987) Dr. Robert Fellenz – Director of Adult Educational Research, Montana State University, Kellogg Project. Students perceptions of the USU COM-NET experience were evaluated and six factors were identified:

1. Instructional Setting 2. Instructor 3. Media Use 4. Learner Motivation 5. Learner Time Commitment 6. Learning Style

Results: The instructor was credited as having the greatest effect on learning

* "If I can choose between taking a class in a traditional way or on COM-NET, my first question is 'Who is the professor?' I'll take a good professor every time whether it's live or COM-NET!"

H. Written – Instructor comments Contextual data is gathered quarterly from all instructors on the system (categorized, analyzed, and implemented)

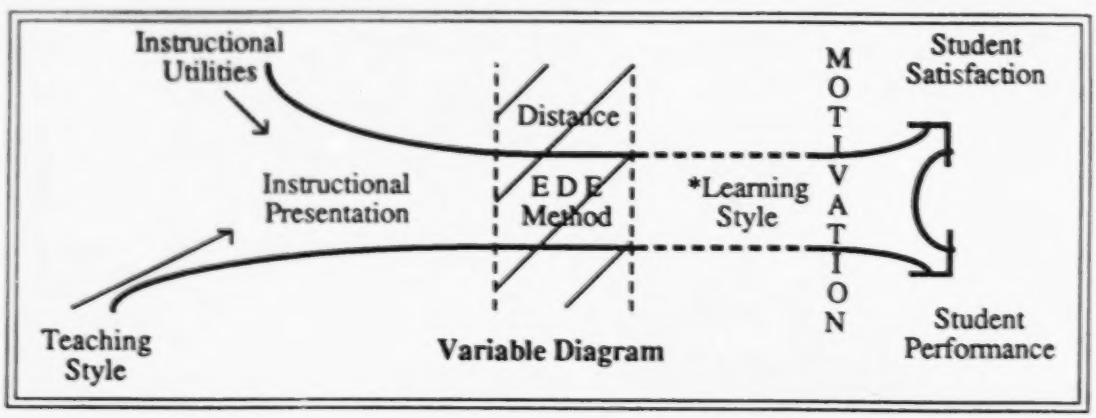
* "There is no on-campus reward structure for COM-NET"
* "I believe COM-NET should have the dollars to provide more front end course development for the system
* "COM-NET requires more preparation than traditional campus courses. The planning and redesign of materials was useful and carried over to campus courses." (Seamons, 1987a)

I. Logan log book – A day to day record of the functioning of the system is kept by the on campus teaching assistant. Areas of evaluation include:

1. system performance and use of various devices,
2. teaching assistants performance and punctuality,
3. instructional presentations, i.e., technique and devise use, and
4. student reaction to the system, the assistant, and the instructor.

CONCLUSION

Utah State University is in an advantaged position to study the various educational telecommunications methods available. Based upon the following variable model we will continue to emphasize the human elements of the diagram.



Variable Diagram

Devices are in fact mere tools to make life easier by eliminating human hours, allowing individuals to produce more, or accomplish feats never before able. Believing these hardware

developments alone will accomplish all the aspects of educational telecommunication is a fatal error. Controlling, managing, directing, and organizing these technological devices cannot be underestimated (Burnham & Seamons, 1987). In an effort to accomplish more with less, faster and cheaper, the critical infrastructure elements must not be overlooked. With the growth of information compounding exponentially, the need to deliver this information to the residents of rural Utah in a timely manner becomes imperative. New devices will emerge addressing these increasing needs more cost effectively while providing increased interactivity. Paramount with all these changes lie dedicated competent faculty committed to the concepts of rural service, increased teaching proficiency and the dissemination of research, all major elements of a land grant university.

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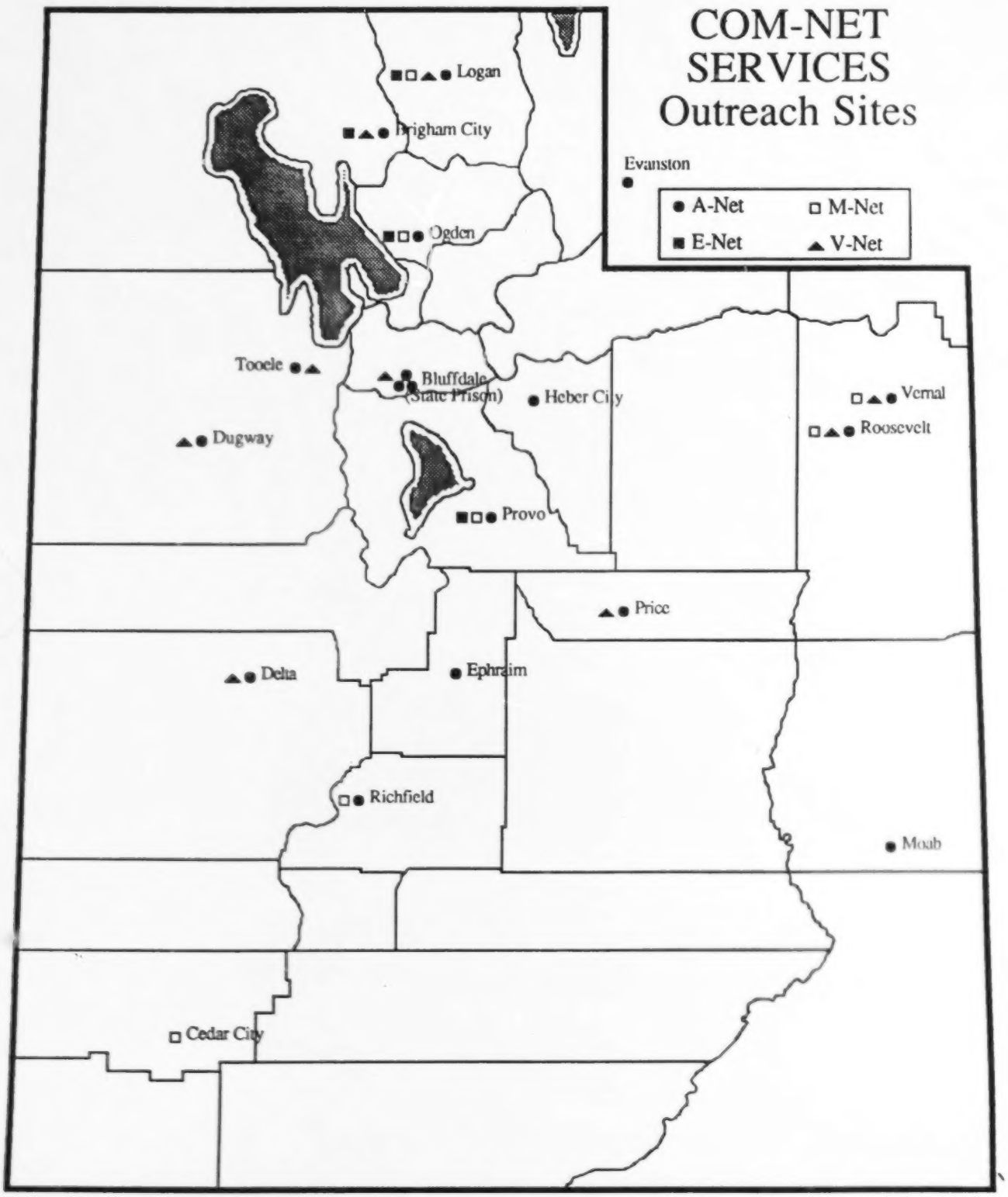
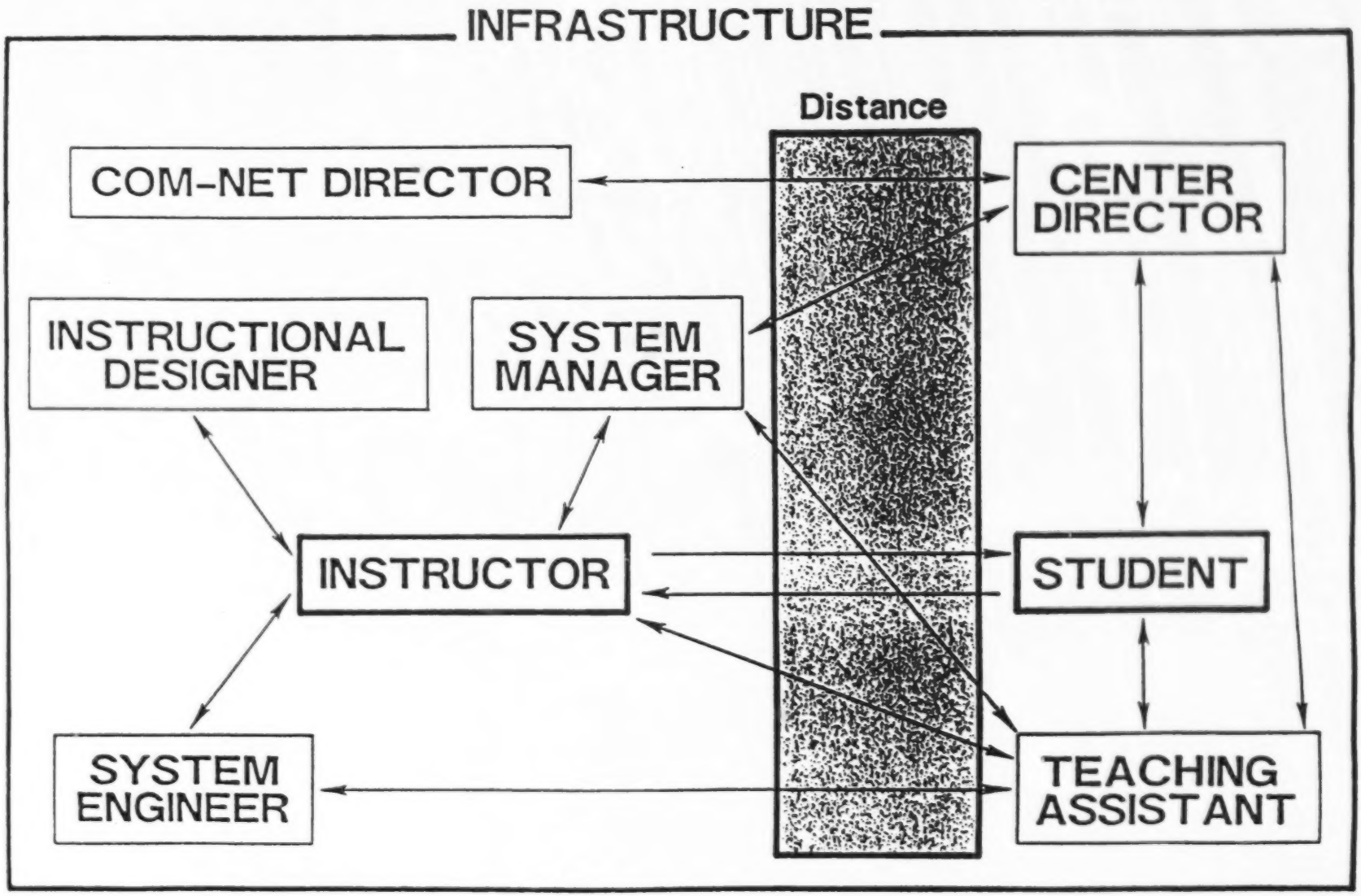
ATTACHMENT A





ATTACHMENT B